

What Is Claimed Is:

1 1. A disk array control apparatus, comprising:

2 a disk array control unit, having a parallel interface for
3 transmitting and receiving a plurality of parallel signals and
4 a shared bus interface for transmitting and receiving stored
5 data;

6 an interface converter, for converting the plurality of
7 parallel signals from the disk array control unit into a
8 plurality of corresponding differential signals and converting
9 a plurality of external differential signals into the plurality
10 of corresponding parallel signals which is then output to the
11 parallel interface; and

12 a network interface unit, having a network I/O port
13 connecting with an external network, the network interface unit
14 connected to the shared bus interface, for passing the stored
15 data from the shared bus interface through the network I/O port
16 to the external network, and for passing remote data from the
17 external network through the network I/O port to the shared bus
18 interface.

1 2. The disk array control apparatus as claimed in claim 1,
2 wherein the interface converter comprises:

3 a plurality of parallel-to-serial signal converters, for
4 receiving and converting the parallel signals into a plurality
5 of corresponding digital serial signals when the disk array
6 control unit transmits data to the interface converter, and for
7 converting the digital serial signals into corresponding
8 parallel signals when the interface converter transmits data to
9 the disk array control unit; and

10 a plurality of differential transceivers, for converting the
11 digital serial signals into a plurality of corresponding
12 differential signals when the disk array control unit transmits
13 data to the interface converter, and for converting the
14 differential signals into corresponding digital serial signals
15 when the interface converter transmits data to the disk array
16 control unit.

1 3. The disk array control apparatus as claimed in claim 2,
2 wherein the differential transceiver is a low voltage
3 differential signal (LVDS) transceiver.

4 4. The disk array control apparatus as claimed in claim 1,
5 wherein the disk array control unit is a Redundant Array of
6 Independent Drives (RAID) controller, providing at least two
7 RAID levels for disk fault tolerance.

8 5. The disk array control apparatus as claimed in claim 1,
9 wherein the parallel interface satisfies an IDE/ATA standard.

1 6. The disk array control apparatus as claimed in claim 1,
2 wherein the network interface unit comprises:

3 a media access control (MAC) circuit, for converting the
4 stored data from the shared bus interface into a bitstream
5 compliant with an Ethernet MAC layer protocol when the disk array
6 control apparatus transmits data to the external network, and
7 converting the bitstream to a format compatible with the shared
8 bus interface when the disk array control apparatus receives
9 data from the external network; and

10 a physical circuit, for exchanging the bitstream from the MAC
11 circuit with a network physical signal of the remote data.

1 7. A network storage apparatus comprising:

2 a plurality of disk devices, each providing a disk interface
3 signal;

4 a disk array control unit, having a parallel interface for
5 transmitting and receiving a plurality of parallel signals and
6 a shared bus interface for transmitting and receiving stored
7 data;

8 a first interface converter, for converting the plurality of
9 parallel signals from the disk array control unit into a
10 plurality of corresponding differential signals and converting
11 a plurality of external differential signals into the
12 corresponding plurality of parallel signals which is then output
13 to the parallel interface;

14 a second interface converter, for converting the disk
15 interface signals into the plurality of corresponding
16 differential signals received by the first interface
17 converters, and converting the plurality of differential
18 signals from the first interface converter into the
19 corresponding disk interface signals which is then output to the
20 disk devices; and

21 a network interface unit, having a network I/O port
22 connecting with an external network, the network interface unit
23 connected to the shared bus interface, for passing the stored
24 data from the shared bus interface through the network I/O port
25 to the external network, and for passing remote data from the
26 external network through the network I/O port to the shared bus
27 interface.

1 8. The network storage apparatus as claimed in claim 7, wherein
2 the first interface converter comprises:

3 a plurality of first parallel-to-serial signal converters,
4 receiving and converting the plurality of parallel signals into
5 a plurality of corresponding first digital serial signals when
6 the disk array control unit transmits data to the first interface
7 converter, and converting the plurality of first digital serial
8 signals into the plurality of corresponding parallel signals
9 when the first interface converter transmits data to the disk
10 array control unit; and

11 a plurality of first differential transceivers, converting
12 the first digital serial signals into a plurality of
13 corresponding differential signals when the disk array control
14 unit transmits data to the first interface converter, and
15 converting the differential signals into corresponding first
16 digital serial signals when the first interface converter
17 transmits data to the disk array control unit.

1 9. The network storage apparatus as claimed in claim 7, wherein
2 the second interface converter comprises:

3 a plurality of second parallel-to-serial signal converters,
4 converting the disk interface signals into a plurality of
5 corresponding second digital serial signals when the disk device
6 transmits data to the second interface converter, and converting
7 the plurality of second digital serial signals into the
8 corresponding disk interface signals when the second interface
9 converter transmits data to the disk device; and

10 a plurality of second differential transceivers, converting
11 the second digital serial signals into the plurality of

12 corresponding differential signals when the disk device
13 transmits data to the second interface converter, and converting
14 the plurality of differential signals into the plurality of
15 corresponding second digital serial signals when the first
16 interface converter transmits data to the second interface
17 converter.

1 10. The network storage apparatus as claimed in claim 9, wherein
2 the first and second differential transceivers are low voltage
3 differential signal (LVDS) transceivers.

4 11. The network storage apparatus as claimed in claim 7, wherein
5 the disk array control unit is a Redundant Array of Independent
6 Drives (RAID) controller providing at least two RAID levels for
7 disk fault tolerance.

8 12. The network storage apparatus as claimed in claim 7, wherein
9 the parallel interface is IDE/ATA compatible.

1 13. The network storage apparatus as claimed in claim 7, wherein
2 the disk interface signal is IDE/ATA compatible.

3 14. The network storage apparatus as claimed in claim 7, wherein
4 the network interface unit comprises:

5 a media access control (MAC) circuit, converting the stored
6 data from the shared bus interface into a bitstream compliant
7 with an Ethernet MAC layer protocol when the network storage
apparatus transmits data to the external network, and for
converting the bitstream to a format compatible with the shared

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8 bus interface when the network storage apparatus receives data
9 from the external network; and
10 a physical circuit, exchanging the bitstream from the MAC
11 circuit with a network physical signal of the remote data.

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